PATENT
2342-0111P

IN THE U.S. PATENT AND TRADEMARK OFFICE

In re application of Before the Board of Appeals

Kazuyuki TOYODA et al.

Serial No.:	08/905,971	Art Unit: 1763
Filed:	August 5, 1997	Examiner: R. Zervigon
For:	SUBSTRATE PROCESSING APPARATUS	

BRIEF ON APPEAL ON BEHALF OF APPELLANT
FILED UNDER PROVISIONS OF 37 C.F.R. § 1.192

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Honorable Commissioner of Patents
And Trademarks
Washington, D.C. 20231

Due: March 2, 2004

Dear Sir:

This is an Appeal from the Final Rejection dated July 1, 2003, of claims 1-36 in the above-identified application.

I. REAL PARTY IN INTEREST

The instant application is presently assigned to Kokusai Electric Co. Ltd., Tokyo, Japan a corporation organized and existing under the laws of Japan, as recorded on August 5, 1997 at reel 8733, frame 0857-0862.

II. RELATED APPEALS OR INTERFERENCES

There are no pending Appeals or Interferences related to the present application known to Appellant or Appellant's Legal

Representatives.

III. STATUS OF CLAIMS

All of claims 1-36 stand rejected.

IV. STATUS OF AMENDMENTS AFTER FINAL

No Amendment after Final has been submitted, therefore no Amendment after Final has been granted or refused entry.

V. SUMMARY OF INVENTION

The present invention is directed to providing a substrate processing apparatus that requires only a small floor space and yet is capable of accomplishing a high net working rate.

A substrate processing apparatus according to the present invention comprises a substrate transfer section 100, a plurality of modules 300 and a common first substrate transfer robot 20, for example, provided in the substrate transfer section for transferring substrates to and from each of the plurality of modules 300. In other words, the common first substrate transfer robot 20 is shared by each of the plurality of modules 300.

The plurality of modules 300 are piled up, separately from one another, in a vertical direction. Each of the plurality of modules 300 are detachably mounted to the substrate transfer section 100 and includes a substrate processing chamber 56, an intermediate chamber 54, a first gate valve 66 disposed between

the substrate processing chamber 56 and the intermediate chamber 54, a second gate valve 62 disposed between the intermediate chamber 54 and the substrate transfer section 100, and a second substrate transfer robot 80 disposed in the intermediate chamber.

Referring to appellants' Figs. 1A to 9, because the plurality of connection modules 300 are piled up in a vertical direction, the space occupied in a clean room by the semiconductor wafer processing apparatus 1 is not increased.

Furthermore, the maintenance areas of the semiconductor wafer processing apparatus 1 can be confined to only a maintenance area illustrated by 112 at the side of the cassette loader unit 100 and a maintenance area illustrated by 114 at the side of a reaction processing chamber 56. (see Appellants' Fig. 1A)

Furthermore, because each of the plurality of the connection modules 300 is detachably mounted to the wall 12 of the cassette loader chamber 10 and the plurality of the connection modules 300 are separate from one another, the number of the modules to be mounted to the chamber wall 12 of the cassette loader chamber 10 can be appropriately selected in accordance with the number of wafers required to be processed per hour and type of processing. For example, the substrate processing apparatus may assume a single-stage module structure as shown in Fig.2, or a three-stage module structure as shown in Fig.3.

According to the second aspect for example, in each of the connection modules 300, an outer gate vale 62, a load lock chamber

52, a gate valve 64, a transfer chamber 54, a gate valve 66 and a reaction processing chamber 56 are connected and disposed in this order from the side of the cassette loader chamber 10. (see appellants' Figs. 2 & 3).

A wafer transfer robot 80 and a driving device 55 for driving the wafer transfer robot 80 are preferably provided in the transfer chamber 54. This wafer transfer robot 80 can transfer the wafers 5 between a wafer boat 70 and the susceptor 90 in the processing chamber 56. (see appellants' Figs. 2 & 3).

Because the transfer chamber 54 of each of the connection modules 300 is provided with the wafer transfer robot 80 which can transfer the wafers 5 between the wafer boat 70 and the susceptor 90 in this manner, it is possible to transfer the wafers 5 from and into the reaction processing chamber 56 irrespective of the processing state in the reaction processing chamber 56 of the other connection modules 300. Because each of the connection modules 300 is provided with the reaction processing chamber 56 and the wafer transfer robot 80 in this manner, it is possible to carry out the wafers 5 irrespective of the processing state in the other reaction processing chambers 56 and as a result, it is possible to constantly keep a time period in which the wafers 5 are heated in each of the connection modules 300. (see appellants' specification, page 14, lines 10-23).

The cassette loader chamber 10 is provided therein with a cassette transferring-cum-wafer transferring robot 20 (i.e., a

common first substrate transfer device) and an elevator 30 for lifting and lowering the cassette transferring-cum-wafer transferring robot 20. When the elevating portion 34 is vertically moved, and in accordance with such movement, the cassette transferring-cum-wafer transferring robot 20 attached to the elevating portion 34 is vertically moved so that the cassette introduction port and the two connection modules 300 can be accessed by the common robot 20. (see appellants' specification, page 17, line 19 to page 18 line 7).

In other words, the cassette loader chamber 10 (i.e., the substrate transfer section) is provided therein with the cassette transferring-cum-wafer transferring robot 20 (i.e., a common first substrate transfer device) to allow the wafers 5 to be transferred to and from the two individual connection modules 300. The transfer chamber 54 (i.e., the first intermediate chamber) of the connection module 300 is provided with the wafer transfer robot 80 (i.e., the second substrate transfer device) to allow the wafers 5 to be transferred to and from the reaction processing chamber 56. Therefore, transfer of the wafers 5 to each of the connection modules 300 and transfer of the wafers 5 within each of the modules 300 can be accomplished independently and efficiently. (see appellants' specification, page 18, lines 8-17).

VI. ISSUES

The issues presented for review are:

(I) Whether claims 1-4, 7-16 and 20-36 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,405,435 to Tateishi et al. (hereafter Tateishi) in view of JP 2-152251 to Takagi (hereafter Takagi).

(II) Whether claims 5, 6, 17 and 18 are unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,405,435 to Tateishi et al.(hereafter Tateishi) in view of JP 2-152251 to Takagi(hereafter Takagi) and further in view of U.S. Patent No. 5,616,208 to Hideki (hereafter Hideki).

(III) Whether claim 19 is unpatentable under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 4,405,435 to Tateishi et al.(hereafter Tateishi) in view of JP 2-152251 to Takagi(hereafter Takagi) and further in view of U.S. Patent No. 4,582,720 to Yamazaki (hereafter Yamazaki).

VII. GROUPING OF CLAIMS

(1) Claims 1-4, 7-16 and 20-36 are grouped together and stand or fall together.

(2) Claims 5, 6, 17 and 18 are grouped together and stand or fall together.

(3) Claim 19 is grouped alone, separately argued and stands or falls alone.

VIII. ARGUMENTS

Issue I.

Regarding Issue I, with respect to independent claims 1 and 14, the Examiner alleges that Tateishi describes a substrate processing apparatus (i.e., Tateishi's Fig. 4) where component chambers are each hermetically configured and the Examiner further alleges that Tateishi's processing apparatus exhibits the following attributes:

i. a substrate transfer section embodied by Tateishi as item 52 or 53, (Tateishi, Fig. 4, col. 5, lines 40-55);

ii. a module (Tateishi's items 52-54);

iii. a first substrate transfer means embodied by Tateishi's item 62 provided inside…,

iv. a substrate transfer section (Tateishi's items 52 or 53) capable of transferring a substrate within the module;

v. a first valve (Tateishi's items 64, 71) capable of establishing hermetic isolation between the processing chambers;

vi. a second valve (Tateishi's item 71) capable of establishing hermetic isolation between the first and second intermediate processing chambers and a substrate transfer section embodied by Tateishi's item 52;

vii. a third valve providing isolation between the first and second intermediate processing chambers;

viii. first and second intermediate processing chambers additionally provided with second substrate transfer means

(Tateishi's item 67) capable of transferring a substrate to a processing chamber;

ix. all components chambers are hermetically configured;

x. an intermediate chamber (Tateishi's items 52 or 53) supporting substrate holding means (items 65 or 72) positioned closer to the substrate transfer section (item 52) than the second substrate transfer means (item 78);

xi. cassette holding means accommodating a plurality of substrates (items 63, 68, 75; col. 5, lines 55-65) where the first substrate transfer means is capable of transferring a substrate between the cassette and the plurality of chambers;

xii. Tateishi describes a first substrate transfer means structure capable of transferring a wafer cassette (items 67, col. 6, lines 16-30); and

xiii. Tateishi describes a cassette introduction section whose height is different from the height of the cassette holding means (all Figures); and

xiv. Tateishi describes transferring and processing a single wafer at a time (Figure 7, col. 17, lines 14-21).

(see Final Office Action, pages 2-4).

However, the Examiner also states that Tateishi fails to expressly describe modules piled up separately in a substantially vertical direction. Also, the Examiner states that Tateishi fails to expressly describe varying the number (one or more) of

transferred and/or processed substrates. (see Final Office Action, page 4).

In an attempt to make up for the admitted deficiencies in Tateishi, the Examiner imports Takagi. Specifically, the Examiner alleges that Takagi describes the following:

a. a manufacturing system of vertical-type arrangement;

b. a process chamber installed in each stage position of a space positioned in an up-and-down direction in order to reduce a floor area and to easily install more systems;

c. all component chambers each hermetically configured and can be independently reduced in pressure (Takagi, Abstract);

d. an elevator capable of vertically moving a first substrate transfer means (item 11, 14; constitution);

e. component chambers each hermetically configured (certified STIC translation, page 5, 2nd paragraph) and each exhibiting the following attributes:

i. a substrate transfer section (item 14, Fig. 1) (certified STIC translation, page 12, 3rd paragraph;

ii. a plurality of directly detachably (1st paragraph, page 11) attached modules (items 14/2/3, Fig. 1; certified STIC translation, pages 10-12);

iii. a plurality of modules (items 2, Fig. 1; certified STIC Translation, pages 10-12) for

processing substrates;

iv. the modules are capable of being attached to and detached from the substrate transfer section (page 11, 1st paragraph);

v. a common first substrate transfer means (item 14, Fig. 1; certified STIC translation, pages 10-12) provided in

vi. a substrate transfer section (item 14, Fig. 1) capable of transferring a substrate to the plurality of modules; and

vii. a first valve (item 12, Fig. 1) capable of establishing hermetic isolation between the processing chambers for processing substrates and a plurality of modules where the first valve is closed allowing a substrate to pass through when opened (certified STIC translation, page 5, 2nd paragraph; page 12, 1st paragraph).

(see Final Office Action, pages 4-6).

Finally, the Examiner alleges that it would have been obvious to one of ordinary skill in the art at the time of the invention to modify Tateishi's substrate processing apparatus by implementing Takagi's processing apparatus hermetically configured exhibiting modules piled up separately in a substantially vertical direction to reduce a floor area and to easily install more system

which is centered on reducing the clean room foot print in order to reduce operating cost. (see Final Office Action, page 6).

In response to appellants' arguments filed February 27, 2003 that the combination of Tateishi and Takagi fails to teach or suggest a common first substrate transfer device provided in the first substrate transfer section for transferring substrates into the plurality of modules, as set forth in independent claims 1 and 14, the Examiner states:

"...that Tateishi expressly teaches a common first substrate transfer device (item 62, Fig. 4, col. 6, lines 55-68) provided in the first substrate transfer section (item 52 or 53, Fig. 4), for transferring substrates (3) into a module (Fig. 2)." (emphasis added). (see Final Office Action, page 11).

"Tateishi's module (Fig. 2) has first (64) and second (71) valves and an intermediate chamber (item 52 or 53, Fig. 4)." (see Final Office Action, page 11).

"Tateishi discloses a single module, not modules, as items 52-54 (Fig. 4). (see Final Office Action, page 11);

"Tateishi's collected items 52-54 make up "one module" with component parts 52, 53 as substrate transfer sections and component 54 as a processing/treatment chamber." (see Final Office Action, page 11); and

"Tateishi further teaches a common first substrate transfer device (62) provided in the transfer section for transferring the

substrates (3) into the one module."

"...Takagi teaches Tateishi's deficiencies. Specifically, Takagi teaches modules (each of the three items 2, 3; Fig. 1) piled up in a substantially vertical direction such that the plurality of modules (three in Takagi's Fig. 1) are capable of being attached to and detached from a wall of the transfer section. (Takagi, page 11, 1st paragraph).

In response to appellants' arguments that Takagi fails to teach or suggest an elevator capable of vertically moving a common first substrate transfer means because Takagi expressly discloses that each module has its own transfer means 14; the Examiner states:

"Takagi does teach an elevator (mechanism 11, Fig. 1, 2; page 12, 2nd paragraph) capable of vertically moving a first substrate transfer means (items 11, 14; constitution, as stated in the original rejection) because each of Takagi's modules has its own transfer means 14 that operates with Takagi's cassette elevator for transporting a wafer cassette to the position of each chamber."

Appellants Response to Examiner's Interpretation of Tateishi & Takagi

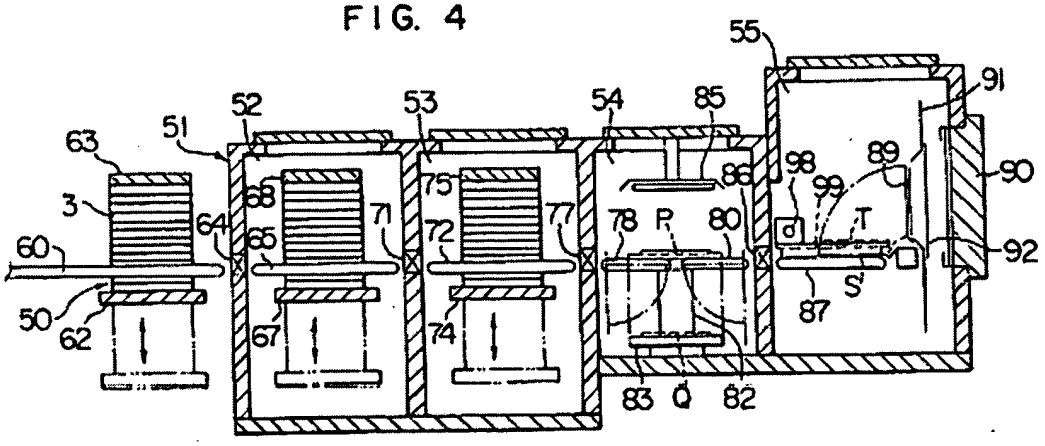
Appellants respectfully disagree with the Examiner's interpretation of both Tateishi and Takagi for at least the following reasons:

Appellants respectfully submit that the combination of Tateishi and Takagi fail to teach or suggest each and every feature as set forth in the claimed invention. In particular, the combination of Tateishi and Takagi at least fails to teach or suggest a common first substrate transfer device, provided in the substrate transfer section, for transferring substrates into the plurality of modules, as set forth in independent claims 1 and 14.

For example, the Examiner in the Final Office Action states that Tateishi teaches a common first substrate transfer device as item 62 provided in the first substrate transfer section (items 52 or 53) for transferring Substrates into a module. (see Final Office Action, page 11).

First of all, however, appellants respectfully point out that Tateishi's item 62 is not provided in items 52 or 53, as noted by the Examiner. Item 62, which is a cassette elevator, is located in the first outside storage means 50 and precedes items 52 and 53 in the flow of substrates. Furthermore, item 62 only moves up and down to place base plates in the cassette 63. As such, the Examiner has mis-categorized item 62 of Tateishi as being provided in items 52 or 53 and has mischaracterized item 62 as being capable of transferring substrates to the modules. (see below the Fig. 4 of Tateishi and col. 6, lines 1-9).

FIG. 4



Secondly, the Examiner expressly states that Tateishi only discloses a single module (comprising items 52-54), not a plurality of modules. (see page 11 of Final Office Action). As such, appellants respectfully submit that it is impossible for Tateishi to have a common first substrate transfer device for a plurality of modules when it only discloses a single module.

Appellants respectfully direct the Examiner's attention to the standard and ordinary meaning of the word "common" which means: belonging to or shared by two or more individuals or things or by all members of a group. (See Merriam Webster's Collegiate Dictionary 10th Edition)

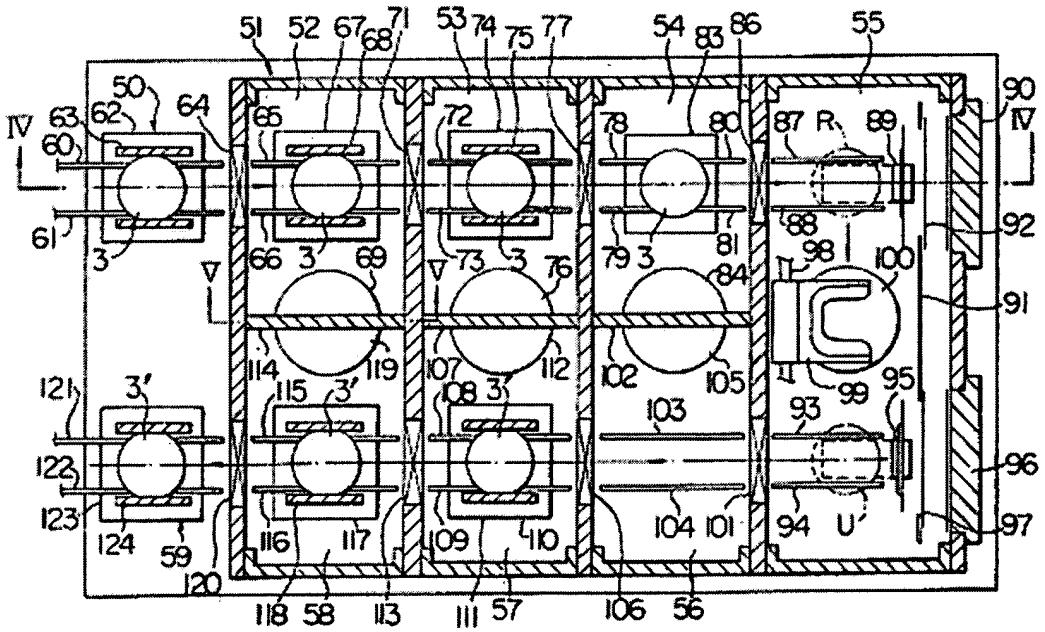
Thirdly, appellants respectfully submit that even if we were to ignore the fact that Tateishi only discloses a single module, Tateishi also fails to disclose a common transfer device that transfers a substrate into each module. Tateishi merely discloses conveyor belts 60 and 61 which are used to introduce the base plates 3 into the inlet chamber 52. (see Fig. 4, col. 6,

lines 10-15). However, such conveyor belts 60, 61 fail to be common (shared by two or more) to more than one module or even to more than one chamber of Tateishi's single module. Each of Tateishi's chambers 52, 53 and 54 has its own conveyor belt system. Specifically, each module 52-55 in Tateishi contains its own cassette elevator 62, 67, 74, 83 etc. for placing the base plates on the shelves of the cassette. In other words, each elevator is only capable of transferring a base plate to at most one chamber adjacent thereto in a single flow direction. Stated again, Tateishi fails to disclose a common substrate transfer device provided in the transfer section for transferring substrates into a plurality of modules.

Fourthly, appellants respectfully submit that Tateishi fails to teach or suggest an intermediate chamber being provided with a second substrate transfer device for transferring the substrates to and from the substrate processing chamber, as set forth in claim 1. As noted above, Tateishi only discloses using a pair of conveyor belts 72 and 73 along with a cassette elevator 74 to transfer the substrates to the processing chamber 54. As such, the flow of substrates in the Tateishi device is only in one direction, i.e., from the first outside storing means 50 to the second outside storing means 59 in a U-shape direction. (see Tateishi, Fig. 3 on next page). Thus, Tateishi fails to disclose a second substrate transfer device in the intermediate chamber that transfers the substrates to and from the substrate

processing chamber. The Examiner erroneously alleges that item 67 of Tateishi discloses such a second transfer device feature. Appellants disagree with this interpretation. Item 67 of Tateishi merely works in combination with conveyor belts 65 and 66 to move the substrate in one direction into the next chamber, but fails to also remove the substrate from such chamber. In Tateishi, the substrates only move in one direction through the chambers.

FIG. 3



Fifthly, appellants respectfully submit that Tateishi fails to teach or suggest a first intermediate chamber being provided

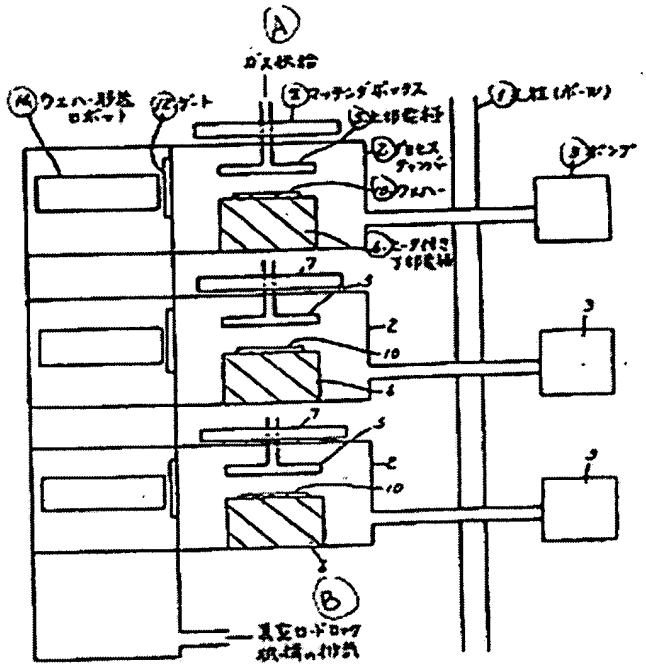
with a second substrate transfer device capable of transferring the substrates between the substrates holding device in the second intermediate chamber and the substrate processing chamber, as set forth in claim 14. The Examiner again alleges that Tateishi discloses such a feature in item 67, as noted above. For at least the reasons noted above, appellants respectfully submit that Tateishi fails to disclose such back and forth motion for the second substrate transfer device 67.

In an attempt to make up for the deficiencies found in Tateishi, the Office Action tries to import the teachings of Takagi. However, appellants respectfully submit that Takagi, like Tateishi, also fails to teach or suggest each and every feature as set forth above even when combined with Tateishi.

For example, like Tateishi, Takagi also fails to disclose a common first substrate transfer device provided in the substrate transfer section for transferring substrates into each of the plurality of modules.

The Examiner alleges that item 11 of Takagi provides for an elevator capable of vertically moving a first substrate transfer means 14. However, appellants respectfully point out that transfer means 14 is not a common transfer means between a plurality of modules because each module 2 has its own transfer means 14. (see Takagi, page 8, lines 9-11; and Fig. 1 of Takagi below). Only the cassette elevator 11 is common to all modules 2.

However, Takagi's elevator 11 is only capable of bringing the cassettes to the position of each module, instead of being able to transfer the substrates into the modules, as set forth in the claimed invention.



(D)本発明実施例の搬送システムの断面図

第 1 図

Furthermore, Takagi, like Tateishi, fails to teach or suggest an intermediate chamber being provided with a second substrate transfer device for transferring the substrates to and from the substrate processing chamber, as set forth in claims 1 and 14. Takagi's modules 2 only consist of a single processing chamber, because no intermediate chamber(s) is/are disclosed. As

such, Takagi fails to disclose an intermediate chamber having a second transfer device, as further set forth in clams 1 and 14.

Appellants respectfully submit that the combination of Tateishi and Takagi fail to teach or suggest each and every feature as set forth in the claimed invention, for at least the reasons noted above.

To establish a *prima facie* case of Obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991). See MPEP 706.02(j).

Appellants respectfully submit that not only does the combined references fail to teach or suggest each and every feature as set forth in the claimed invention, but that one of ordinary skill in the art would not have been motivated to combine/modify the teachings of Tateishi with Takagi because there is no teaching or suggestion in any of the references

regarding how one would modify such systems to arrive at the claimed invention.

For example, Tateishi's system is configured as an U-shape device utilizing conveyor belts and multiple elevators, whereas Takagi uses a common elevator and multiple robots. Appellants respectfully submit that the Examiner has failed to show how the Tateishi system could be modified to have the vertical configuration of Takagi when conveyor belts are being used.

Appellants respectfully submit that independent claims 1 and 14 are allowable over the combination of Tateishi and Takagi for at least the reasons noted above.

Appellants further respectfully submit that dependent claims 2-4, 7-13, 15, 16 and 20-36 are also allowable by virtue of their dependency and for the additional features recited therein, for at least the reasons set forth above.

For the reasons, as set forth in this section, reversal of the Examiner's rejection of claims 1-4, 7-16 and 20-36 under 35 U.S.C. §103(a) is respectfully requested.

Issue II.

Regarding Issue II, with respect to dependent claims 5, 6, 17 and 18, the Examiner alleges that such claim are rejected over Tateishi as applied to claims 1-4, 7-16 and 20-36 as noted above, and further in view of Hideki. (Please noted that the Examiner has failed to properly set forth all references being relied on for

this rejection, e.g., Takagi is left out).

With respect to the dependent claims, the Examiner alleges that Tateishi fails to describe processing substrates under atmospheric pressure through a substrate transfer section. However, The Examiner believes that Hideki describes a vacuum processing apparatus including a plurality of vacuum processing chambers. (see Final office Action, page 7). Furthermore, the Examiner alleges that it would have been obvious to modify Tateishi' multichamber processing apparatus with the substrate transfer section (items 20, 21) of Hideki while sustaining atmospheric pressure as taught by Hideki because of being able to select where, during the processing of the substrates, the reactant gas will be introduced. The Examiner goes on to say that such selection is within the independent pressure control as exhibited by the references and encompassed within the level of ordinary skill in view of the cited references. (see Final Office Action, page 8).

Appellants respectfully submit that Hideki fails to make up for the deficiencies found in the combination of Tateishi and Takagi noted above.

Furthermore, Appellants respectfully submit that based on a thorough review of the cited references, particularly Tateishi and Takagi, appellants find no teaching or suggestion to support the examiner's asserted motivation to combine the references so as to select where in the processing the reactant gas will be

introduced. The examiner's motivation statement is clearly unsupported because the examiner has not established that "selection of where in the process" is a factor even recognized by Tateishi and/or Takagi. The examiner has not pointed to any showing in either of these references that would suggest that selection of where in the process is an issue recognized in either reference.

Appellants respectfully submit that but for appellants' own disclosure of the specific features/elements involved, the applied references themselves would not have instructed one versed in the art on how to go about selectively reworking and modifying the Tateishi's system to yield appellant's claimed machine.

Accordingly, appellants submit that the Examiner's rejection is predicated upon impermissible hindsight, and not upon a suggestion from the combination of the references applied that would have been derivable by one versed in the art from the references themselves.

Once again, Appellants disagree with the Examiner's interpretation and submits that the combination of Tateishi, Takagi and Hideki fail to make obvious the presently claimed invention. In particular, Appellants respectfully submit that the Examiner has failed to establish a prima facie showing of obviousness since the Examiner clearly must rely on the disclosure of the present invention to provide the motivation for modifying

Tateishi. To establish a *prima facie* case of obviousness, (1) there must be some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to combine/modify the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references when combined must teach or suggest all the claim limitations. See *MPEP* §2142-43.

Appellants submit that the Final Office Action has improperly used Appellant's invention as a road map to pick and choose features from different sources and piece the chosen features together to arrive at the claimed invention, even though the reference does not provide any teachings, suggestion or motivation to make the combination/modification. For the reasons noted above and those that follow, it is respectfully submitted that a *prima facie* case of obviousness cannot be maintained in this application.

Appellants respectfully submit that dependent claims 5, 6, 17 and 18 are not obvious and are allowable, for at least the reasons set forth above, over the combination of Tateishi, Takagi and Hideki.

Accordingly, reversal of the Examiner's rejection of claims 5, 6, 17 and 18 under 35 U.S.C. §103(a) is respectfully requested.

Issue III.

Regarding Issue III, with respect to claim 19, the Examiner states that claim 19 is rejected over Tateishi in view of Yamazaki. (Please noted that the Examiner has again failed to properly set forth all references being relied on for this rejection, e.g., Takagi is left out).

With respect to dependent claim 19, the Examiner alleges that Tateishi fails to describe an intermediate chamber supporting heat-resistant substrate holding means positioned closer to the substrate transfer section than the second substrate transfer means.

However, the Examiner believes that Yamazaki describes a substrate transfer section (item A, Fig. 1), an intermediate chamber (item B, Fig. 1) and a final processing chamber (item C, Fig. 1). The Examiner goes on to say that the intermediate chamber (item B) supports heat-resistant substrate holding means (item 70) used in the intermediate processing chamber under a heated plasma process. (see Final Office Action, page 9).

The Examiner's motivation for combining Tateishi and Takagi with Yamazaki is drawn from the fact that plasma generating apparatus commonly operate at elevated temperatures. (see Final Office Action, page 10).

Appellants respectfully submit that Yamazaki fails to make up for the deficiencies found in the combination of Tateishi and Takagi noted above.

Furthermore, Appellants respectfully submit that from a thorough review of the cited references, particularly Tateishi and Takagi, appellants find no teaching or suggestion to support the examiner's asserted motivation to combine the references. The examiner's motivation statement is clearly unsupported because the examiner has not established that "elevated temperatures" is a factor even recognized by Tateishi and/or Takagi. The examiner has not pointed to any showing in either of these references that would suggest that operating at elevated temperatures is an issue recognized in either reference.

Appellants respectfully submit that but for appellants' own disclosure of the specific features/elements involved, the applied references themselves would not have instructed one versed in the art on how to go about selectively reworking and modifying the Tateishi's system to yield appellant's claimed machine.

Accordingly, appellants submit that the Examiner's rejection is predicated upon impermissible hindsight, and not upon a suggestion from the combination of the references applied that would have been derivable by one versed in the art from the references themselves.

Once again, Appellants disagree with the Examiner's interpretation and submits that the combination of Tateishi, Takagi and Yamazaki fail to make obvious the presently claimed invention. In particular, Appellants respectfully submit that the

Examiner has failed to establish a prima facie showing of obviousness since the Examiner clearly must rely on the disclosure of the present invention to provide the motivation for modifying Tateishi. To establish a *prima facie* case of obviousness, (1) there must be some suggestion or motivation (either in the references themselves or in the knowledge generally available to one of ordinary skill in the art) to combine/modify the reference teachings; (2) there must be a reasonable expectation of success; and (3) the prior art references when combined must teach or suggest all the claim limitations. See *MPEP* §2142-43.

Appellants submit that the Final Office Action has improperly used Appellant's invention as a road map to pick and choose features from different sources and piece the chosen features together to arrive at the claimed invention, even though the reference does not provide any teachings, suggestion or motivation to make the combination/modification. For the reasons noted above and those that follow, it is respectfully submitted that a *prima facie* case of obviousness cannot be maintained in this application.

Appellants respectfully submit that dependent claim 19 is not obvious and is allowable, for at least the reasons set forth above, over the combination of Tateishi, Takagi and Yamazaki.

Accordingly, reversal of the Examiner's rejection of claim 19 under 35 U.S.C. §103(a) is respectfully requested.

Conclusion

For the reasons advanced above, it is respectfully submitted that all claims, 1-36, in this application are allowable. Thus, favorable reconsideration and reversal of the Examiner's rejection of claims 1-36 under 35 U.S.C. §103(a), by the Honorable Board of Patent Appeals and Interferences, is respectfully solicited.

The appropriate fee required for an Appeal Brief is attached hereto.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

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MKM/CTB/mpe
2342-0111P
Attachment: APPENDIX

APPENDIX
CLAIMS ON APPEAL

1. (previously presented) A substrate processing apparatus, comprising:

a substrate transfer section;

a plurality of modules, each of said plurality of modules being directly detachably attached to said substrate transfer section; and

a common first substrate transfer device, provided in said substrate transfer section, for transferring substrates into said plurality of modules,

wherein said plurality of modules are piled up adjacent to, but spaced separately from one another in a substantially vertical direction such that said plurality of modules are capable of being attached to and detached from a wall of said substrate transfer section independent of one another,

wherein each of said plurality of modules comprises:

a substrate processing chamber, having a hermetic structure, for processing said substrates;

an intermediate chamber having a hermetic structure and provided between said substrate processing chamber and said substrate transfer section;

a first valve provided between said substrate processing chamber and said intermediate chamber, said first valve capable of establishing hermetic isolation between said

substrate processing chamber and said intermediate chamber when closed, and capable of allowing said substrates to pass therethrough when opened; and

a second valve provided between said intermediate chamber and said substrate transfer section, said second valve capable of establishing hermetic isolation between said intermediate chamber and said substrate transfer section when closed, and capable of allowing said substrates to pass therethrough when opened, and

wherein said intermediate chamber is provided with a second substrate transfer device for transferring said substrates to and from said substrate processing chamber.

2. (previously presented) A substrate processing apparatus as recited in claim 1, wherein, in each of said plurality of modules:

said substrate processing chamber has a hermetic structure of vacuum level for processing said substrates;

said intermediate chamber has a hermetic structure of vacuum level;

said first valve is capable of establishing hermetic isolation of vacuum level between said substrate processing chamber and said intermediate chamber when closed, and is capable of allowing said substrates to pass therethrough when opened; and

said second valve is capable of establishing hermetic

isolation of vacuum level between said intermediate chamber and said substrate transfer section when closed, and is capable of allowing said substrates to pass therethrough when opened.

3. (original) A substrate processing apparatus as recited in claim 2, wherein said substrate processing chamber and said intermediate chamber can be independently reduced in pressure.

4. (previously presented) A substrate processing apparatus as recited in claim 1, wherein said intermediate chamber is further provided with a substrate holding device capable of holding said substrates, said substrate holding device being positioned closer to said substrate transfer section than said second substrate transfer device.

5. (previously presented) A substrate processing apparatus as recited in claim 1, wherein said substrate transfer section transfers said substrates under atmospheric pressure.

6. (previously presented) A substrate processing apparatus as recited in claim 5, wherein said substrates are processed under a reduced pressure in said substrate processing chamber.

7. (previously presented) A substrate processing apparatus as recited in claim 1, wherein said substrate transfer section is further provided with a cassette holding device for holding a cassette capable of accommodating a plurality of said substrates, said first substrate transfer device being capable of transferring said substrates between said cassette and said plurality of modules.

8. (previously presented) A substrate processing apparatus as recited in claim 7, wherein said first substrate transfer device is provided with a structure capable of transferring said cassette.

9. (previously presented) A substrate processing apparatus as recited in claim 1, wherein said substrate transfer section is further provided with an elevator capable of vertically moving said first substrate transfer device.

10. (previously presented) A substrate processing apparatus as recited in claim 9, wherein said substrate transfer section is further provided with a cassette introducing section for transferring said cassette into said substrate transfer section and carrying out said cassette from said substrate transfer section, said cassette introducing section being disposed at a

predetermined height which is different from the height of said cassette holding device.

11. (previously presented) A substrate processing apparatus as recited in claim 1, wherein said substrate processing apparatus is capable of processing a plurality of said substrates simultaneously, and said second substrate transfer device is capable of transferring simultaneously the same number of substrates as said plurality of substrates to be simultaneously processed by said substrate processing apparatus.

12. (previously presented) A substrate processing apparatus as recited in claim 11,

wherein said substrate processing apparatus is a plasma enhanced processing apparatus for processing said substrates utilizing plasma, and includes a second substrate holding device capable of holding said plurality of substrates with the substrates being laterally arranged side by side, and

wherein said substrate transfer device is capable of transferring simultaneously said plurality of substrates laterally arranged side by side.

13. (original) A substrate processing apparatus as recited in claim 1, wherein said substrate processing apparatus is capable

of processing a plurality of said substrates simultaneously, and said second substrate transfer means is capable of transferring said plurality of substrates one by one to respective their processing positions where said plurality of substrates are to be simultaneously processed.

14. (previously presented) A substrate processing apparatus, comprising:

a substrate transfer section;

a plurality of modules, each of said plurality of modules being directly detachably mounted to said substrate transfer section; and

a common first substrate transfer device, provided in said substrate transfer section, for transferring substrates into said plurality of modules,

wherein said plurality of modules are piled up adjacent to, but spaced separately from one another in a substantially vertical direction such that said plurality of modules are capable of being attached to and detached from said substrate transfer section independent of one another,

wherein said plurality of modules are piled up adjacent to, but spaced separately from one another in a substantially vertical direction such that said plurality of modules are capable of being attached to and detached from a wall of said substrate transfer section independent of one another,

wherein each of said plurality of modules comprises:

a substrate processing chamber, having a hermetic structure, for processing said substrates;

first and second intermediate chambers provided between said substrate processing chamber and said substrate transfer section, each having a hermetic structure, said first intermediate chamber being located closer to said substrate processing chamber than said second intermediate chamber, and said second intermediate chamber being located closer to said substrate transfer section than said first intermediate chamber;

a first valve provided between said substrate processing chamber and said first intermediate chamber, said first valve capable of establishing hermetic isolation between said substrate processing chamber and said first intermediate chamber when closed, and capable of allowing said substrates to pass therethrough when opened;

a second valve provided between said first intermediate chamber and said second intermediate chamber, said second valve capable of establishing hermetic isolation between said first intermediate chamber and said second intermediate chamber when closed, and capable of allowing said substrate or said substrates to pass therethrough when opened; and

a third valve provided between said second intermediate chamber and said substrate transfer section, said third valve capable of establishing hermetic isolation between said second

intermediate chamber and said substrate transfer section when closed, and capable of allowing said substrates to pass therethrough when opened,

wherein said second intermediate chamber is provided with a substrate holding device capable of holding said substrates, and

wherein said first intermediate chamber is provided with a second substrate transfer device capable of transferring said substrates between said substrate holding device and said substrate processing chamber.

15. (previously presented) A substrate processing apparatus as recited in claim 14, wherein, in each of said plurality of modules:

said substrate processing chamber has a hermetic structure of vacuum level for processing said substrates;

said first and second intermediate chambers each have a hermetic structure of vacuum level;

said first valve is capable of establishing hermetic isolation of vacuum level between said substrate processing chamber and said first intermediate chamber when closed, and is capable of allowing said substrates to pass therethrough when opened;

said second valve is capable of establishing hermetic isolation of vacuum level between said first intermediate chamber

and said second intermediate chamber when closed, and is capable of allowing said substrates to pass therethrough when opened; and

said third valve is capable of establishing hermetic isolation of vacuum level between said second intermediate chamber and said substrate transfer section when closed, and is capable of allowing said substrates to pass therethrough when opened.

16. (original) A substrate processing apparatus as recited in claim 15, wherein said substrate processing chamber, said first intermediate chamber and said second intermediate chamber can be independently reduced in pressure.

17. (previously presented) A substrate processing apparatus as recited in claim 14, wherein said substrate transfer section transfers said substrates under atmospheric pressure.

18. (previosuly presented) A substrate processing apparatus as recited in claim 17, wherein said substrates are processed under a reduced pressure in said substrate processing section.

19. (previously presented) A substrate processing apparatus as recited in claim 14, wherein said substrate holding device is a

heat-resistant substrate holding device.

20. (previously presented) A substrate processing apparatus as recited in claim 14, wherein said substrate transfer section is further provided with a cassette holding device for holding a cassette capable of accommodating a plurality of said substrates, said first substrate transfer device being capable of transferring said substrate or said substrates between said cassette held by said cassette holding device and said plurality of modules.

21. (previously presented) A substrate processing apparatus as recited in claim 20, wherein said first substrate transfer device is provided with a structure capable of transferring said cassette.

22. (previously presented) A substrate processing apparatus as recited in claim 14, wherein said substrate transfer section is further provided with an elevator capable of vertically moving said first substrate transfer device.

23. (previously presented) A substrate processing apparatus as recited in claim 22, wherein said substrate transfer section is further provided with a cassette introducing section

for transferring said cassette into said substrate transfer section and carrying out said cassette from said substrate transfer section, said cassette introducing section being disposed at a predetermined height which is different from the height of said cassette holding device.

24. (previously presented) A substrate processing apparatus as recited in claim 14, wherein said substrate processing apparatus is capable of processing a plurality of said substrates simultaneously, and said second substrate transfer device is capable of transferring simultaneously the same number of substrates as said plurality of substrates to be simultaneously processed by said substrate processing apparatus.

25. (previously presented) A substrate processing apparatus as recited in claim 24,

wherein said substrate processing apparatus is a plasma enhanced processing apparatus for processing said substrates utilizing plasma, and includes a second substrate holding device capable of holding said plurality of substrates with the substrates being laterally arranged side by side, and

wherein said substrate transfer device is capable of transferring simultaneously said plurality of substrates laterally arranged side by side.

26. (presented previously) A substrate processing apparatus as recited in claim 14, wherein said substrate processing apparatus is capable of processing a plurality of said substrates simultaneously, and said second substrate transfer device is capable of transferring said plurality of substrates one by one to respective their processing positions where said plurality of substrates are to be simultaneously processed.

27. (previously presented) A substrate processing apparatus as recited in claim 1, wherein the apparatus is configured to transfer and process a single substrate at a time.

28. (previously presented) A substrate processing apparatus as recited in claim 1, wherein the apparatus is configured to transfer a single substrate and to process a plurality of substrates at a time.

29. (previously presented) A substrate processing apparatus as recited in claim 14, wherein the apparatus is configured to transfer a plurality of substrates and to process a single substrate at a time.

30. (previously presented) A substrate processing apparatus as recited in claim 14, wherein the apparatus is configured to transfer and process a single substrate at a time.

31. (previously presented) A substrate processing apparatus as recited in claim 14, wherein the apparatus is configured to transfer a single substrate and to process a plurality of substrates at a time.

32. (previously presented) A substrate processing apparatus as recited in claim 14, wherein the apparatus is configured to transfer a plurality of substrates and to process a single substrate at a time.

33. (previously presented) A substrate processing apparatus as recited in claim 1, wherein the apparatus is configured to transfer a plurality of substrate at a time and to process a plurality of substrate at a time.

34. (previously presented) A substrate processing apparatus as recited in claim 14, wherein the apparatus is configured to transfer a plurality of substrate at a time and to process a plurality of substrate at a time.

35. (previously presented) A substrate processing apparatus as recited in claim 1, further including a plurality of cassette holders disposed in said substrate transfer section, each for holding a cassette.

36. (previously presented) A substrate processing apparatus as recited in claim 1, further including a plurality of cassette holders disposed in said substrate transfer section, each for holding a cassette.